

03-R-312, Center For Nanophase Materials Sciences Oak Ridge National Laboratory, Oak Ridge, Tennessee

1. Construction Schedule History

Fiscal Quarter				Total Estimated Cost (\$000)	Total Project Cost (\$000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		

FY 2003 Budget Request (Preliminary Estimate)	2Q2002	1Q2003	3Q2003	4Q2006	\$64,000	\$65,000
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2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Project Engineering & Design (PED)			
2002	1,500 ^a	1,500 ^a	1,500 ^a
2003	1,000 ^a	1,000 ^a	1,000 ^a
Construction			
2003	24,000 ^a	24,000 ^a	14,000 ^a
2004	20,000	20,000	20,000
2005	17,500	17,500	21,500
2006	0	0	6,000

^a Funding of \$1,000,000 in FY 2003 and \$2,000,000 in FY 2004 was identified in the FY 2002 President's Request for this project. Based on the results of peer review, this project is now proposed for PED funding of \$1,500,000 in FY 2002 and \$1,000,000 in FY 2003 and construction funding of \$24,000,000 in FY 2003.

3. Project Description, Justification and Scope

This proposed Center for Nanophase Materials Sciences (CNMS) will establish a nanoscale science research center at Oak Ridge National Laboratory (ORNL) that will integrate nanoscale science research with neutron science, synthesis science, and theory/modeling/simulation of nanophase materials, bringing together four areas where the United States has clear national research needs. The total gross area of the new building will be approximately 80,000 square feet, providing state-of-the-art clean rooms, and general laboratories for sample preparation, fabrication and analysis. Included will be initial equipment for nanoscale materials research such as surface analysis equipment, nanofabrication facilities, etc. The facility, collocated with the Spallation Neutron Source complex, will house ORNL staff members and visiting scientists from academia and industry. There are no existing buildings at ORNL that could serve these needs.

The CNMS's major scientific thrusts will be in nano-dimensioned soft materials, complex nanophase materials systems, and the crosscutting areas of interfaces and reduced dimensionality that become scientifically critical on the nanoscale. A major focus of the CNMS will be to exploit ORNL's unique facilities and capabilities in neutron scattering to determine the structure of nanomaterials, to develop a detailed understanding of synthesis and self-assembly processes in "soft" materials, and to study and understand collective (cooperative) phenomena that emerge on the nanoscale. Neutron scattering provides unique information (complementary to that provided by other methods) about both the atomic-scale structure and the dynamics of a wide variety of condensed matter systems including polymers, macromolecular systems, magnetic and superconducting materials, and chemically complex materials, particularly oxides and hydrogen-containing structures. The intense neutron beams available at the upgraded High Flux Isotope Reactor and the new Spallation Neutron Source will make broad classes of related nanoscale phenomena accessible to fundamental study.

Since the late 1980s, there has been a recognized need to enhance U.S. capabilities in the synthesis of materials. These concerns are exacerbated by the challenges of controlled synthesis of nanophase materials. There is currently a critical, unmet national need for the synthesis of high quality nanophase research materials. It is also recognized that the existence of capabilities for science-driven synthesis of novel materials has played a central role in some of the most spectacular recent discoveries of new phenomena, including high-temperature superconductivity, the quantum and fractional quantum Hall effects, conducting polymers, and colossal magnetoresistance. Therefore, synthesis and characterization of nanophase materials (including copolymers and macromolecular systems, multilayered nanostructures, ceramics, composites, and alloys with nanoscale spatial, charge, and/or magnetic ordering) will be an essential component of the CNMS. With these capabilities the CNMS will become a national resource for nanophase materials for use by researchers across the nation.

The scope of this project is to construct the Center for Nanophase Materials Sciences. The engineering effort includes preliminary and final design. The project also includes procurement of experimental capital equipment and construction of facilities. While no FY 2002 PED funds were identified for this project on the FY 2002 PED Project Data Sheet (02-SC-002, Project Engineering Design (PED), various locations), SC plans to allocate FY 2002 and FY 2003 PED funding to complete design of the CNMS. FY 2003 construction funding will be used to initiate construction and equipment procurement.

4. Details of Cost Estimate¹

(dollars in thousands)		
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design Costs.....	1,700	N/A
Design and Project Management Costs	300	N/A
Total, Design Costs.....	2,000	N/A
Construction Phase		
Improvements to Land	500	N/A
New Building and Additions	19,700	N/A
Special Equipment ²	26,000	N/A
Utilities	500	N/A
Inspection, design and project liaison, testing, checkout and Acceptance	1,800	N/A
Construction and Project Management.....	1,700	N/A
Total, Construction Costs.....	50,200	N/A
Contingency (23.5% of Construction Costs) ³	11,800	N/A
Total, Line Item Costs	64,000	N/A
Less: Non-Agency Contribution	0	N/A
Total, Line Item Costs (TEC).....	64,000	N/A

¹ The annual escalation rates are: FY 2002 – 2.6%, FY 2003 – 2.8%, FY 2004 – 2.8%, FY 2005 – 2.9% and FY 2006 – 2.9% as directed by DOE.

² Initial research equipment.

³ Percent of TEC includes contingency for special equipment in the calculation.

5. Method of Performance

Design will be performed by an architect-engineer utilizing a fixed price subcontract. Construction will be performed by a fixed-price construction contractor administered by the ORNL operating contractor. Procurement of research capital equipment will be performed by the ORNL operating contractor. Project and construction management, inspection, coordination, utility tie-ins, testing and checkout witnessing, and acceptance will be performed by the ORNL operating contractor.

6. Schedule of Project Funding

	Prior Years	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	Total
Project Cost							
Facility Cost							
Design	0	1,500	1,000	0	0	0	2,500
Construction	0	0	14,000	20,000	21,500	6,000	61,500
Total, Line item TEC	0	1,500	15,000	20,000	21,500	6,000	64,000
Other project costs							
Conceptual design costs....	150	0	0	0	0	0	150
NEPA documentation Costs	5	0	0	0	0	0	5
Other project related Costs ¹	0	220	100	250	175	100	845
Total, Other Project Costs	155	220	100	250	175	100	1,000
Total Project Cost	155	1,720	15,100	20,250	21,675	6,100	65,000
Less: Non-Agency Contribution ..	0	0	0	0	0	0	0
Total, Project Cost (TPC)	155	1,720	15,100	20,250	21,675	6,100	65,000

¹ Experimental research will begin at the time of beneficial occupancy of the facility. These research costs are not part of the TPC and are funded by the BES subprograms.

7. Related Annual Funding Requirements

(FY 2006 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	\$18,000	N/A
Total related annual funding	TBD	N/A
Total operating costs (operating from FY 2006 through FY 2055)	TBD	N/A

8. Design and Construction of Federal Facilities

All DOE facilities are designed and constructed in accordance with applicable Public Laws, Executive Orders, OMB Circulars, Federal Property Management Regulations, and DOE Orders. The total estimated cost of the project includes the cost of measures necessary to assure compliance with Executive Order 12088, “Federal Compliance with Pollution Control Standards”; section 19 of the Occupational Safety and Health Act of 1970, the provisions of Executive Order 12196, and the related Safety and Health provisions for Federal Employees (CFR Title 29, Chapter XVII, Part 1960); and the Architectural Barriers Act, Public Law 90-480, and implementing instructions in 41 CFR 101-19.6. This project will be located in an area not subject to flooding determined in accordance with the Executive Order 11988. DOE has reviewed the U.S. General Services Administration (GSA) inventory of Federal Scientific laboratories and found insufficient space available, as reported by the GSA inventory.